C-A OPERATIONS PROCEDURES MANUAL

ATTACHMENT

4.120.12.h 12 O'clock (PEER 13) Oxygen Deficiency Hazard Tests

C-A-OPM Procedures in which this Attachment is used.		
4.120.12		

Hand Processed Changes

HPC No.	Date	Page Nos.	Initials

Approved: ***Signature on File*** _____
Collider-Accelerator Department Chairman Date

V. Castillo

4.120.12.h 12 O'clock (PEER 13) Oxygen Deficiency Hazard Tests

PASS ANNUAL ACCEPTANCE TEST PROTOCOL

Division A Software Filename and Checksum: Title:_____ Checksum: _____

Division B Software Filename and Checksum: Title:_____ Checksum: _____

Initial testing complete:

Test Team Leader's Name (Print): _____ Life Number: _____

Test Team Leader's Name (Sign): _____ Date: _____/____/_____

Acceptance test procedure complete (following repairs and retesting if required):

Test Team Leader's Name (Print): _____ Life Number:_____

Test Team Leader's Name (Sign): _____ Date: _____/____/_____

Test results reviewed by:

Safety Section Head's Name (Print):_____ Life Number: _____

Safety Section Head's Name (Sign):_____ Date: _____/____/_____

Test results accepted by Radiation Safety Committee:

RSC Member's Name (Print):_____ Life Number: _____

RSC Member's Name (Sign):_____ Date: _____/____/_____

1.1 Conduct a visual check on Peer 13 Crash and Crash/ODH boxes following Table 1 below
√ = ok, x = problem

BOXES		Verify mechan condn. ok	Verify elec. condn. ok	Crash/ODH boxes only				Verify all X's corrected
				Division A		Division B		
CRASH	Crash/ODH			Lcd Rdg	Tp2 – Tp4 Vltg	Lcd Rdg	Tp2 – Tp4 Vltg	
11CB1		□	□	N/A	N/A	N/A	N/A	□
	11CB2	□	□	%	V	%	V	□
11CB3		□	□	N/A	N/A	N/A	N/A	□
	11CB4	□	□	%	V	%	V	□
12XCB1		□	□	N/A	N/A	N/A	N/A	□
	12XCB2	□	□	%	V	%	V	□
	12XCB3	□	□	%	V	%	V	□
12XCB4		□	□	N/A	N/A	N/A	N/A	□
	12XCB5	□	□	%	V	%	V	□
	12CB1	□	□	%	V	%	V	□
12CB2		□	□	N/A	N/A	N/A	N/A	□
	12CB3	□	□	%	V	%	V	□
	12CB4	□	□	%	V	%	V	□

Table 1 – Summary of visual check on Crash and Crash/ODH boxes in Peer 13

1.2 Verification of valid calibration of ODH sensors in Peer 13, following Table 2 below
√ = ok, x = problem

ODH sensor	Verify valid calibration	Record calibration date	Verify all x's corrected	Record new calibration date
11AS1	□	_____/_____/_____	□	_____/_____/_____
11AS2	□	_____/_____/_____	□	_____/_____/_____
12XAS1	□	_____/_____/_____	□	_____/_____/_____
12XAS2	□	_____/_____/_____	□	_____/_____/_____
12XAS3	□	_____/_____/_____	□	_____/_____/_____
12AS1	□	_____/_____/_____	□	_____/_____/_____
12AS2	□	_____/_____/_____	□	_____/_____/_____
12AS3	□	_____/_____/_____	□	_____/_____/_____

Table 2 – Verification of valid calibration of ODH sensors in Peer 13

1.3 Test of ODH sensor 11AS1 in 11CB2

	PLACE	**Peer 13** in **Mode 8**	
□	**VERIFY**	**Peer 13** is in **Restricted Access**	**MODE 8**
	FLOW	**Helium (or Nitrogen)** gas across **11AS1**	
	RECORD	**Oxygen** trip level for **Div A**	**_____ %**
	RECORD	**Oxygen** trip level for **Div B**	**_____ %**
□	**VERIFY**	**MCR** sees **11AS1 Div A**	**TRIPPED**
□	**VERIFY**	**MCR** sees **11AS1 Div B**	**TRIPPED**
□	**VERIFY**	**Div A & B strobes** on **11CB2** are	**FLASHING**
□	**VERIFY**	**Div A & B sonalerts** on **11CB2** are	**SOUNDING**
□	**VERIFY**	Fan **11EF2** is	**ON**
□	**VERIFY**	Vent **11AV1** is	**OPEN**
□	**VERIFY**	Vent **11AV2** is	**OPEN**
	HALT	**Flow** of gas on **11AS1**	
	WAIT	For **11AS1** to clear (level ~ trip-level above)	
□	**VERIFY**	**Div A & B strobes** and **sonalerts** on **11CB2** are	**OFF**
□	**VERIFY**	Fan **11EF2** is	**OFF**
□	**VERIFY**	Vent **11AV1** is	**CLOSED**
□	**VERIFY**	Vent **11AV2** is	**CLOSED**
	RESET	**ODH** in **MCR**	
□	**VERIFY**	**MCR** sees **ODH** as	**RESET**

□ **Check for Test Acceptance of sensor 11AS1**

1.4 Test of ODH sensor 11AS2 in 11CB4

	PLACE	**Peer 13** in **Mode 8**	
□	**VERIFY**	**Peer 13** is in **Restricted Access**	**MODE 8**
	FLOW	**Helium (or Nitrogen)** gas across **11AS2**	
	RECORD	**Oxygen** trip level for **Div A**	**_____ %**
	RECORD	**Oxygen** trip level for **Div B**	**_____ %**
□	**VERIFY**	**MCR** sees **11AS2 Div A**	**TRIPPED**
□	**VERIFY**	**MCR** sees **11AS2 Div B**	**TRIPPED**
□	**VERIFY**	**Div A & B strobes** on **11CB4** are	**FLASHING**
□	**VERIFY**	**Div A & B sonalerts** on **11CB4** are	**SOUNDING**
□	**VERIFY**	Fan **12XEF1**is	**ON**
□	**VERIFY**	Vent **11AV2** is	**OPEN**
□	**VERIFY**	Vent **11AV3** is	**OPEN**
	HALT	**Flow** of gas on **11AS2**	
	WAIT	For **11AS2** to clear (level ~ trip-level above)	
□	**VERIFY**	**Div A & B strobes** and **sonalerts** on **11CB4** are	**OFF**
□	**VERIFY**	Fan **12XEF1** is	**OFF**
□	**VERIFY**	Vent **11AV2** is	**CLOSED**
□	**VERIFY**	Vent **11AV3** is	**CLOSED**
	RESET	**ODH** in **MCR**	
□	**VERIFY**	**MCR** sees **ODH** as	**RESET**

□ **Check for Test Acceptance of sensor 11AS2**

1.5 Test of ODH sensor 12XAS1 in 12XCB2

	PLACE	**Peer 13** in **Mode 8**	
□	**VERIFY**	**Peer 13** is in **Restricted Access**	**MODE 8**
	FLOW	**Helium (or Nitrogen)** gas across **12XAS1**	
	RECORD	**Oxygen** trip level for **Div A**	**_____ %**
	RECORD	**Oxygen** trip level for **Div B**	**_____ %**
□	**VERIFY**	**MCR** sees **12XAS1 Div A**	**TRIPPED**
□	**VERIFY**	**MCR** sees **12XAS1 Div B**	**TRIPPED**
□	**VERIFY**	**Div A & B strobes** on **12XCB2** are	**FLASHING**
□	**VERIFY**	**Div A & B sonalerts** on **12XCB2** are	**SOUNDING**
□	**VERIFY**	Fan **12XEF1** is	**ON**
□	**VERIFY**	Vent **11AV2** is	**OPEN**
□	**VERIFY**	Vent **11AV3** is	**OPEN**
	HALT	**Flow** of gas on **12XAS1**	
	WAIT	For **12XAS1** to clear (level ~ trip-level above)	
□	**VERIFY**	**Div A & B strobes** and **sonalerts** on **12XCB2** are	**OFF**
□	**VERIFY**	Fan **12XEF1** is	**ON**
□	**VERIFY**	Vent **11AV2** is	**CLOSED**
□	**VERIFY**	Vent **11AV3** is	**CLOSED**
	RESET	**ODH** in **MCR**	
□	**VERIFY**	**MCR** sees **ODH** as	**RESET**

□ **Check for Test Acceptance of sensor 12XAS1**

1.6 Test of ODH sensor 12XAS2 in 12XCB3

	PLACE	**Peer 13** in **Mode 8**	
□	**VERIFY**	**Peer 13** is in **Restricted Access**	**MODE 8**
	FLOW	**Helium (or Nitrogen)** gas across **12XAS2**	
	RECORD	**Oxygen** trip level for **Div A**	**_____ %**
	RECORD	**Oxygen** trip level for **Div B**	**_____ %**
□	**VERIFY**	**MCR** sees **12XAS2 Div A**	**TRIPPED**
□	**VERIFY**	**MCR** sees **12XAS2 Div B**	**TRIPPED**
□	**VERIFY**	**Div A & B strobes** on **12XCB3** are	**FLASHING**
□	**VERIFY**	**Div A & B sonalerts** on **12XCB3** are	**SOUNDING**
□	**VERIFY**	Fan **12XEF2** is	**ON**
□	**VERIFY**	Vent **12AV1** is	**OPEN**
□	**VERIFY**	Vent **12AV2** is	**OPEN**
	HALT	**Flow** of gas on **12XAS2**	
	WAIT	For **12XAS2** to clear (level ~ trip-level above)	
□	**VERIFY**	**Div A & B strobes** and **sonalerts** on **12XCB3** are	**OFF**
□	**VERIFY**	Fan **12XEF2** is	**OFF**
□	**VERIFY**	Vent **12AV1** is	**CLOSED**
□	**VERIFY**	Vent **12AV2** is	**CLOSED**
	RESET	**ODH** in **MCR**	
□	**VERIFY**	**MCR** sees **ODH** as	**RESET**

□ **Check for Test Acceptance of sensor 12XAS2**

1.7 Test of ODH sensor 12AS1 in 12CB1

	PLACE	**Peer 13** in **Mode 8**	
□	**VERIFY**	**Peer 13** is in **Restricted Access**	**MODE 8**
	FLOW	**Helium (or Nitrogen)** gas across **12AS1**	
	RECORD	**Oxygen** trip level for **Div A**	**_____ %**
	RECORD	**Oxygen** trip level for **Div B**	**_____ %**
□	**VERIFY**	**MCR** sees **12AS1 Div A**	**TRIPPED**
□	**VERIFY**	**MCR** sees **12AS1 Div B**	**TRIPPED**
□	**VERIFY**	**Div A & B strobes** on **12CB1** are	**FLASHING**
□	**VERIFY**	**Div A & B sonalerts** on **12CB1** are	**SOUNDING**
□	**VERIFY**	Fan **12XEF2** is	**ON**
□	**VERIFY**	Vent **12AV1** is	**OPEN**
□	**VERIFY**	Vent **12AV2** is	**OPEN**
	HALT	**Flow** of gas on **12AS1**	
	WAIT	For **12AS1** to clear (level ~ trip-level above)	
□	**VERIFY**	**Div A & B strobes** and **sonalerts** on **12CB1** are	**OFF**
□	**VERIFY**	Fan **12XEF2** is	**OFF**
□	**VERIFY**	Vent **12AV1** is	**CLOSED**
□	**VERIFY**	Vent **12AV2** is	**CLOSED**
	RESET	**ODH** in **MCR**	
□	**VERIFY**	**MCR** sees **ODH** as	**RESET**

□ **Check for Test Acceptance of sensor 12AS1**

1.8 Test of ODH sensor 12AS2 in 12CB3

	PLACE	**Peer 13** in **Mode 8**	
□	**VERIFY**	**Peer 13** is in **Restricted Access**	**MODE 8**
	FLOW	**Helium (or Nitrogen)** gas across **12AS2**	
	RECORD	**Oxygen** trip level for **Div A**	**_____ %**
	RECORD	**Oxygen** trip level for **Div B**	**_____ %**
□	**VERIFY**	**MCR** sees **12AS2 Div A**	**TRIPPED**
□	**VERIFY**	**MCR** sees **12AS2 Div B**	**TRIPPED**
□	**VERIFY**	**Div A & B strobes** on **12CB3** are	**FLASHING**
□	**VERIFY**	**Div A & B sonalerts** on **12CB3** are	**SOUNDING**
□	**VERIFY**	Fan **12EF1** is	**ON**
□	**VERIFY**	Vent **12AV2** is	**OPEN**
□	**VERIFY**	Vent **12AV3** is	**OPEN**
	HALT	**Flow** of gas on **12AS2**	
	WAIT	For **12AS2** to clear (level ~ trip-level above)	
□	**VERIFY**	**Div A & B strobes** and **sonalerts** on **12CB3** are	**OFF**
□	**VERIFY**	Fan **12EF1** is	**OFF**
□	**VERIFY**	Vent **12AV2** is	**CLOSED**
□	**VERIFY**	Vent **12AV3** is	**CLOSED**
	RESET	**ODH** in **MCR**	
□	**VERIFY**	**MCR** sees **ODH** as	**RESET**

□ **Check for Test Acceptance of sensor 12AS2**

1.9 Test of ODH sensor 12AS3 in 12CB4

	PLACE	**Peer 13** in **Mode 8**	
□	**VERIFY**	**Peer 13** is in **Restricted Access**	**MODE 8**
	FLOW	**Helium (or Nitrogen)** gas across **12AS3**	
	RECORD	**Oxygen** trip level for **Div A**	**_____ %**
	RECORD	**Oxygen** trip level for **Div B**	**_____ %**
□	**VERIFY**	**MCR** sees **12AS3 Div A**	**TRIPPED**
□	**VERIFY**	**MCR** sees **12AS3 Div B**	**TRIPPED**
□	**VERIFY**	**Div A & B strobes** on **12CB4** are	**FLASHING**
□	**VERIFY**	**Div A & B sonalerts** on **12CB4** are	**SOUNDING**
□	**VERIFY**	Fan **1EF1** is	**ON**
□	**VERIFY**	Vent **12AV3** is	**OPEN**
□	**VERIFY**	Vent **1AV1** is	**OPEN**
	HALT	**Flow** of gas on **12AS3**	
	WAIT	For **12AS3** to clear (level ~ trip-level above)	
□	**VERIFY**	**Div A & B strobes** and **sonalerts** on **12CB4** are	**OFF**
□	**VERIFY**	Fan **1EF1** is	**OFF**
□	**VERIFY**	Vent **12AV3** is	**CLOSED**
□	**VERIFY**	Vent **1AV1** is	**CLOSED**
	RESET	**ODH** in **MCR**	
□	**VERIFY**	**MCR** sees **ODH** as	**RESET**

□ **Check for Test Acceptance of sensor 12AS3**

1.10 10-minute Activation test of sensor 11AS1 in sector 11

	PLACE	**Peer 13** in **Mode 8**	
□	**VERIFY**	**Peer 13** is in **Restricted Access**	**MODE 8**
	JUMPER	**Tp2 and Tp4** on the **Div A pcb in 11CB2**	
	JUMPER	**Tp2 and Tp4** on the **Div B pcb in 11CB2**	
□	**VERIFY**	**MCR** sees **Peer 13** is in	**MODE 2**
□	**VERIFY**	**MCR** sees **11AS1 Div A**	**TRIPPED**
□	**VERIFY**	**MCR** sees **11AS1 Div B**	**TRIPPED**
□	**VERIFY**	Fan **11EF2** is **immediately**	**ON**
□	**VERIFY**	Vent **11AV1** is **immediately**	**OPEN**
□	**VERIFY**	Vent **11AV2** is **immediately**	**OPEN**
	AFTER	~ **30 secs**	
	TURN	Bypass Switch **to** Bypass	
□	**VERIFY**	**Strobes** □, **Sonalerts** □ and **Fans** (after ~90secs) □	**STOP**
	TURN	Bypass Switch **from** Bypass	
□	**VERIFY**	**Strobes** □, **Sonalerts** □ and **Fans** (after ~30secs) □	**CONTINUE**
	BEGIN	**10-minute timer**	

	RECORD	**Volume of air-flow** at the inlet of fan **11EF2**	**_____ LFM**
		Target flow value (± 10%)	***1592 LFM***
□	**VERIFY**	Air flow at tell-tale of vent **11AV1** is	**ADEQUATE**
□	**VERIFY**	Air flow at tell-tale of vent **11AV2** is	**ADEQUATE**
	AFTER	**~ 10 minutes**	
	RECORD	**Duration of timer**	**_____ mins**
□	**VERIFY**	Fan **10EF1** is	**ON**
□	**VERIFY**	Fan **11EF1** is	**ON**
□	**VERIFY**	Fan **12XEF1** is	**ON**
□	**VERIFY**	Vent **10AV1** is	**OPEN**
□	**VERIFY**	Vent **10AV2** is	**OPEN**
□	**VERIFY**	Vent **10AV3** is	**OPEN**
□	**VERIFY**	Vent **10AV4** is	**OPEN**
	REMOVE	**Jumper** between **Tp2 and Tp4** on the **Div A pcb in 11CB2**	
	REMOVE	**Jumper** between **Tp2 and Tp4** on the **Div B pcb in 11CB2**	
□	**VERIFY**	Fan **11EF2** is	**OFF**
□	**VERIFY**	Vent **11AV1** is	**CLOSED**
□	**VERIFY**	Vent **11AV2** is	**CLOSED**
□	**VERIFY**	Fan **10EF1** is	**OFF**
□	**VERIFY**	Fan **11EF1** is	**OFF**
□	**VERIFY**	Fan **12XEF1** is	**OFF**
□	**VERIFY**	Vent **10AV1** is	**CLOSED**
□	**VERIFY**	Vent **10AV2** is	**CLOSED**
□	**VERIFY**	Vent **10AV3** is	**CLOSED**
□	**VERIFY**	Vent **10AV4** is	**CLOSED**
	RESET	**ODH** in **MCR**	
□	**VERIFY**	**MCR** sees **ODH** as	**RESET**

□ **Check for Test Acceptance of sensor 11AS1 on for > 10 minutes**

1.11 Test Activation of multiple sensors, 11AS2 and 12XAS1, in sector 11

	PLACE	**Peer 13** in **Mode 8**	
□	**VERIFY**	**Peer 13** is in **Restricted Access**	**MODE 8**
	JUMPER	**Tp2 and Tp4** on the **Div A pcb in 11CB4**	
	JUMPER	**Tp2 and Tp4** on the **Div B pcb in 11CB4**	
	JUMPER	**Tp2 and Tp4** on the **Div A pcb in 12XCB2**	
	JUMPER	**Tp2 and Tp4** on the **Div B pcb in 12XCB2**	
□	**VERIFY**	**MCR** sees **Peer 13** is in	**MODE 2**
□	**VERIFY**	**MCR** sees **11AS2 Div A**	**TRIPPED**
□	**VERIFY**	**MCR** sees **11AS2 Div B**	**TRIPPED**
□	**VERIFY**	**MCR** sees **12XAS1 Div A**	**TRIPPED**
□	**VERIFY**	**MCR** sees **12XAS1 Div B**	**TRIPPED**
□	**VERIFY**	Fan **10EF1** is	**ON**
□	**VERIFY**	Fan **11EF1** is	**ON**
□	**VERIFY**	Fan **11EF2** is	**ON**
□	**VERIFY**	Fan **12XEF1** is	**ON**
□	**VERIFY**	Vent **10AV1** is	**OPEN**
□	**VERIFY**	Vent **10AV2** is	**OPEN**
□	**VERIFY**	Vent **10AV3** is	**OPEN**
□	**VERIFY**	Vent **10AV4** is	**OPEN**
□	**VERIFY**	Vent **11AV1** is	**OPEN**
□	**VERIFY**	Vent **11AV2** is	**OPEN**
□	**VERIFY**	Vent **11AV3** is	**OPEN**
	AFTER	**~ 30 secs**	
	TURN	Bypass Switch **to** Bypass	
□	**VERIFY**	**Strobes** □**, Sonalerts** □ and **Fans** (after ~90secs) □	**STOP**
	TURN	Bypass Switch **from** Bypass	
□	**VERIFY**	**Strobes** □**, Sonalerts** □ and **Fans** (after ~30secs) □	**CONTINUE**
	REMOVE	**Jumper** between **Tp2 and Tp4** on the **Div A pcb in 11CB2**	
	REMOVE	**Jumper** between **Tp2 and Tp4** on the **Div B pcb in 11CB2**	
	REMOVE	**Jumper** between **Tp2 and Tp4** on the **Div A pcb in 11CB4**	
	REMOVE	**Jumper** between **Tp2 and Tp4** on the **Div B pcb in 11CB4**	
□	**VERIFY**	Fan **10EF1** is	**OFF**
□	**VERIFY**	Fan **11EF1** is	**OFF**
□	**VERIFY**	Fan **11EF2** is	**OFF**
□	**VERIFY**	Fan **12XEF1** is	**OFF**
□	**VERIFY**	Vent **10AV1** is	**CLOSED**
□	**VERIFY**	Vent **10AV2** is	**CLOSED**
□	**VERIFY**	Vent **10AV3** is	**CLOSED**
□	**VERIFY**	Vent **10AV4** is	**CLOSED**
□	**VERIFY**	Vent **11AV1** is	**CLOSED**
□	**VERIFY**	Vent **11AV2** is	**CLOSED**
□	**VERIFY**	Vent **11AV3** is	**CLOSED**
	RESET	**ODH** in **MCR**	
□	**VERIFY**	**MCR** sees **ODH** as	**RESET**

□ **Check for Test Acceptance of Activation of multiple sensors 11AS2 and 12XAS1 in sector 11**

1.12 10-minute Activation test of sensor 12XAS2 in sector 12

	PLACE	**Peer 13** in **Mode 8**	
□	**VERIFY**	**Peer 13** is in **Restricted Access**	**MODE 8**
	JUMPER	**Tp2 and Tp4** on the **Div A pcb in 12XCB3**	
	JUMPER	**Tp2 and Tp4** on the **Div B pcb in 12XCB3**	
□	**VERIFY**	**MCR** sees **Peer 13** is in	**MODE 2**
□	**VERIFY**	**MCR** sees **12XAS2 Div A**	**TRIPPED**
□	**VERIFY**	**MCR** sees **12XAS2 Div B**	**TRIPPED**
□	**VERIFY**	Fan **12XEF2** is **immediately**	**ON**
□	**VERIFY**	Vent **12AV1** is **immediately**	**OPEN**
□	**VERIFY**	Vent **12AV2** is **immediately**	**OPEN**
	AFTER	**~ 30 secs**	
	TURN	Bypass Switch **to** Bypass	
□	**VERIFY**	**Strobes** □, **Sonalerts** □ and **Fans** (after ~90secs) □	**STOP**
	TURN	Bypass Switch **from** Bypass	
□	**VERIFY**	**Strobes** □, **Sonalerts** □ and **Fans** (after ~30secs) □	**CONTINUE**
	BEGIN	**10-minute timer**	
	RECORD	**Volume of air-flow** at the **upper** inlet of fan **12XEF2** *Target flow value (± 10%) is the sum of both ducts*	**_____ LFM** ***1592 LFM***
□	**VERIFY**	**Air-flow** at tell-tale of vent **12AV1** is	**ADEQUATE**
□	**VERIFY**	**Air-flow** at tell-tale of vent **12AV2** is	**ADEQUATE**
	AFTER	**~ 10 minutes**	
	RECORD	**Duration of timer**	**_____ mins**
□	**VERIFY**	Fan **1EF1** is	**ON**
□	**VERIFY**	Fan **1EF2** is	**ON**
□	**VERIFY**	Fan **1EF3** is	**ON**
□	**VERIFY**	Fan **1EF4** is	**ON**
□	**VERIFY**	Fan **12EF1** is	**ON**
□	**VERIFY**	Vent **1AV1** is	**OPEN**
□	**VERIFY**	Vent **1AV2** is	**OPEN**
□	**VERIFY**	Vent **1AV3** is	**OPEN**
□	**VERIFY**	Vent **12AV3** is	**OPEN**
	REMOVE	**Jumper** between **Tp2 and Tp4** on the **Div A pcb in 12XCB3**	
	REMOVE	**Jumper** between **Tp2 and Tp4** on the **Div B pcb in 12XCB3**	
□	**VERIFY**	Fan **12XEF2** is	**OFF**
□	**VERIFY**	Fan **12AV1** is	**CLOSED**
□	**VERIFY**	Vent **12AV2** is	**CLOSED**
□	**VERIFY**	Fan **1EF1** is	**OFF**
□	**VERIFY**	Fan **1EF2** is	**OFF**
□	**VERIFY**	Fan **1EF3** is	**OFF**
□	**VERIFY**	Fan **1EF4** is	**OFF**
□	**VERIFY**	Fan **12EF1** is	**CLOSED**

□	**VERIFY**	Vent **1AV1** is	**CLOSED**
□	**VERIFY**	Vent **1AV2** is	**CLOSED**
□	**VERIFY**	Vent **1AV3** is	**CLOSED**
□	**VERIFY**	Vent **12AV3** is	**CLOSED**
	RESET	**ODH** in **MCR**	
□	**VERIFY**	**MCR** sees **ODH** as	**RESET**

□ **Check for Test Acceptance of sensor 12XAS2 on for > 10 minutes**

1.13 Test Activation of multiple sensors, 12AS2 and 12AS3, in sector 12

	PLACE	**Peer 13** in **Mode 8**	
□	**VERIFY**	**Peer 13** is in **Restricted Access**	**MODE 8**
	JUMPER	**Tp2 and Tp4** on the **Div A pcb in 12CB3**	
	JUMPER	**Tp2 and Tp4** on the **Div B pcb in 12CB3**	
	JUMPER	**Tp2 and Tp4** on the **Div A pcb in 12CB4**	
	JUMPER	**Tp2 and Tp4** on the **Div B pcb in 12CB4**	
□	**VERIFY**	**MCR** sees **Peer 13** is in	**MODE 2**
□	**VERIFY**	**MCR** sees **12AS2 Div A**	**TRIPPED**
□	**VERIFY**	**MCR** sees **12AS2 Div B**	**TRIPPED**
□	**VERIFY**	**MCR** sees **12AS3 Div A**	**TRIPPED**
□	**VERIFY**	**MCR** sees **12AS3 Div B**	**TRIPPED**
□	**VERIFY**	Fan **1EF1** is	**ON**
□	**VERIFY**	Fan **1EF2** is	**ON**
□	**VERIFY**	Fan **1EF3** is	**ON**
□	**VERIFY**	Fan **1EF4** is	**ON**
□	**VERIFY**	Fan **12EF1** is	**ON**
□	**VERIFY**	Fan **12XEF1** is	**ON**
□	**VERIFY**	Vent **1AV1** is	**OPEN**
□	**VERIFY**	Vent **1AV2** is	**OPEN**
□	**VERIFY**	Vent **1AV3** is	**OPEN**
□	**VERIFY**	Vent **12AV1** is	**OPEN**
□	**VERIFY**	Vent **12AV2** is	**OPEN**
□	**VERIFY**	Vent **12AV3** is	**OPEN**
	AFTER	**~ 30 secs**	
	TURN	Bypass Switch **to** Bypass	
□	**VERIFY**	**Strobes** □, **Sonalerts** □ and **Fans** (after ~90secs) □	**STOP**
	TURN	Bypass Switch **from** Bypass	
□	**VERIFY**	**Strobes** □, **Sonalerts** □ and **Fans** (after ~30secs) □	**CONTINUE**
	REMOVE	**Jumper** between **Tp2 and Tp4** on the **Div A pcb in 112XCB3**	
	REMOVE	**Jumper** between **Tp2 and Tp4** on the **Div B pcb in 112XCB3**	
	REMOVE	**Jumper** between **Tp2 and Tp4** on the **Div A pcb in 12XCB3**	
	REMOVE	**Jumper** between **Tp2 and Tp4** on the **Div B pcb in 12XCB3**	
□	**VERIFY**	Fan **1EF1** is	**OFF**
□	**VERIFY**	Fan **1EF2** is	**OFF**
□	**VERIFY**	Fan **1EF3** is	**OFF**
□	**VERIFY**	Fan **1EF4** is	**OFF**
□	**VERIFY**	Fan **12EF1** is	**OFF**

□	**VERIFY**	Fan **12XEF1** is	**OFF**
□	**VERIFY**	Vent **1AV1** is	**CLOSED**
□	**VERIFY**	Vent **1AV2** is	**CLOSED**
□	**VERIFY**	Vent **1AV3** is	**CLOSED**
□	**VERIFY**	Vent **12AV1** is	**CLOSED**
□	**VERIFY**	Vent **12AV2** is	**CLOSED**
□	**VERIFY**	Vent **12AV3** is	**CLOSED**
	RESET	**ODH** in **MCR**	
□	**VERIFY**	**MCR** sees **ODH** as	**RESET**

□ **Check for Test Acceptance of Activation of multiple sensors 12AS2 and 12AS3 in sector 12**

1.14 Test Manual fan ON/OFF controls in Alcove 11C

	PLACE	**Peer 13** in **Mode 8**	
□	**VERIFY**	**Peer 13** is in **Restricted Access**	**MODE 8**
	PRESS	Fan **ON** button in **Alcove 1C**	
	BEGIN	**90-sec timer**	
□	**VERIFY**	Fan **11EF2** is	**ON**
□	**VERIFY**	Vent **11AV1** is	**OPEN**
□	**VERIFY**	Vent **11AV2** is	**OPEN**
□	**VERIFY**	Vent **11AV3** is	**OPEN**
	PRESS	Fan **OFF** button in **Alcove 1C**	
	AFTER	**90 secs** from **ON** command	
□	**VERIFY**	Fan **11EF2** is	**OFF**
□	**VERIFY**	Vent **11AV1** is	**CLOSED**
□	**VERIFY**	Vent **11AV2** is	**CLOSED**
□	**VERIFY**	Vent **11AV3** is	**CLOSED**

□ **Check for Test Acceptance of Manual fan ON/OFF controls in Alcove 11C**

1.15 Test Manual fan ON/OFF controls at CCW Experimental area fan control box

	PLACE	**Peer 13** in **Mode 8**	
□	**VERIFY**	**Peer 13** is in **Restricted Access**	**MODE 8**
	PRESS	Fan **ON** button in **Experimental area fan control box**	
	BEGIN	**90-sec timer**	
□	**VERIFY**	Fan **12XEF1** is	**ON**
□	**VERIFY**	Vent **11AV2** is	**OPEN**
□	**VERIFY**	Vent **11AV3** is	**OPEN**
	RECORD	**Volume of air-flow** at the inlet of fan **12XEF1**	**_____ LFM**
		Target flow value (± 10%)	***2078 LFM***
□	**VERIFY**	**Air flow** at tell-tale of vent **11AV3** is	**ADEQUATE**
	PRESS	Fan **OFF** button in **CCW Experimental area fan control box**	
	AFTER	**90 secs** from **ON** command	
□	**VERIFY**	Fan **12XEF1** is	**OFF**
□	**VERIFY**	Vent **11AV2** is	**CLOSED**
□	**VERIFY**	Vent **11AV3** is	**CLOSED**

□ **Check for Test Acceptance of Manual fan ON/OFF controls at CCW Experimental area fan control box**

1.16 Test Manual fan ON/OFF controls at CW Experimental area fan control box

	PLACE	**Peer 13** in **Mode 8**	
□	**VERIFY**	**Peer 13** is in **Restricted Access**	**MODE 8**
	PRESS	Fan **ON** button in **Experimental area fan control box**	
	BEGIN	**90-sec timer**	
□	**VERIFY**	Fan **12XEF2** is	**ON**
□	**VERIFY**	Vent **12AV1** is	**OPEN**
□	**VERIFY**	Vent **12AV2** is	**OPEN**
	PRESS	Fan **OFF** button in **CCW Experimental area fan control box**	
	AFTER	**90 secs** from **ON** command	
□	**VERIFY**	Fan **12XEF2** is	**OFF**
□	**VERIFY**	Vent **12AV1** is	**CLOSED**
□	**VERIFY**	Vent **12AV2** is	**CLOSED**

□ **Check for Test Acceptance of Manual fan ON/OFF controls at CW Experimental area fan control box**

1.17 Test Manual fan ON/OFF controls in Alcove 1A

	PLACE	**Peer 13** in **Mode 8**	
□	**VERIFY**	**Peer 13** is in **Restricted Access**	**MODE 8**
	PRESS	Fan **ON** button in **Alcove 1A**	
	BEGIN	**90-sec timer**	
□	**VERIFY**	Fan **1EF1** is	**ON**
□	**VERIFY**	Fan **12EF1** is	**ON**
□	**VERIFY**	Vent **1AV1** is	**OPEN**
□	**VERIFY**	Vent **12AV1** is	**OPEN**
□	**VERIFY**	Vent **12AV2** is	**OPEN**
□	**VERIFY**	Vent **12AV3** is	**OPEN**
	RECORD	**Volume of air-flow** at the inlet of fan **12EF1**	**_____ LFM**
		Target flow value (± 10%)	***2078 LFM***
	RECORD	**Volume of air-flow** at the inlet of fan **1EF1**	**_____ LFM**
		Target flow value (± 10%)	***1592 LFM***
□	**VERIFY**	**Air flow** at tell-tale of vent **1AV1** is	**ADEQUATE**
□	**VERIFY**	**Air flow** at tell-tale of vent **12AV3** is	**ADEQUATE**
	PRESS	Fan **OFF** button in **Alcove 1A**	
	AFTER	**90 secs** from **ON** command	
□	**VERIFY**	Fan **1EF1** is	**OFF**
□	**VERIFY**	Fan **12EF1** is	**OFF**
□	**VERIFY**	Vent **1AV1** is	**CLOSED**
□	**VERIFY**	Vent **12AV1** is	**CLOSED**
□	**VERIFY**	Vent **12AV2** is	**CLOSED**
□	**VERIFY**	Vent **12AV3** is	**CLOSED**

□ **Check for Test Acceptance of Manual fan ON/OFF controls in Alcove 1A**

1.18 Test Manual fan ON/OFF controls in Alcove 1B

	PLACE	**Peer 13** in **Mode 8**	
□	**VERIFY**	**Peer 13** is in **Restricted Access**	**MODE 8**
	PRESS	Fan **ON** button in **Alcove 1B**	
	BEGIN	**90-sec timer**	
□	**VERIFY**	Fan **1EF1** is	**ON**
□	**VERIFY**	Fan **12EF1** is	**ON**
□	**VERIFY**	Vent **1AV1** is	**OPEN**
□	**VERIFY**	Vent 1**2AV1** is	**OPEN**
□	**VERIFY**	Vent **12AV2** is	**OPEN**
□	**VERIFY**	Vent **12AV3** is	**OPEN**
	PRESS	Fan **OFF** button in **Alcove 1B**	
	AFTER	**90 secs** from **ON** command	
□	**VERIFY**	Fan **1EF1** is	**OFF**
□	**VERIFY**	Fan **12EF1** is	**OFF**
□	**VERIFY**	Vent **1AV1** is	**CLOSED**
□	**VERIFY**	Vent 1**2AV1** is	**CLOSED**
□	**VERIFY**	Vent **12AV2** is	**CLOSED**
□	**VERIFY**	Vent **12AV3** is	**CLOSED**

□ **Check for Test Acceptance of Manual fan ON/OFF controls in Alcove 1B**

1.19 Test of Manual fan OFF controls in MCR

	PRESS	Fan **ON** button in **Alcove 1A**	
	PRESS	Fan **ON** button in **Alcove 11C**	
	PRESS	Fan **ON** button in **CW Experimental area**	
	PRESS	Fan **ON** button in **CCW Experimental area**	
	BEGIN	**90-sec timer**	
□	**VERIFY**	Fan **1EF1** is	**ON**
□	**VERIFY**	Fan **11EF2** is	**ON**
□	**VERIFY**	Fan **12EF1** is	**ON**
□	**VERIFY**	Fan **12XEF1** is	**ON**
□	**VERIFY**	Fan **12XEF2** is	**ON**
□	**VERIFY**	Vent **1AV1** is	**OPEN**
□	**VERIFY**	Vent **11AV1** is	**OPEN**
□	**VERIFY**	Vent **11AV2** is	**OPEN**
□	**VERIFY**	Vent **11AV3** is	**OPEN**
□	**VERIFY**	Vent **12AV1** is	**OPEN**
□	**VERIFY**	Vent **12AV2** is	**OPEN**
□	**VERIFY**	Vent **12AV3** is	**OPEN**
	PRESS	Fan **OFF** button in **MCR**	
	AFTER	**90 secs** from **ON** command	

□	**VERIFY**	Fan **1EF1** is	**OFF**
□	**VERIFY**	Fan **11EF2** is	**OFF**
□	**VERIFY**	Fan **12EF1** is	**OFF**
□	**VERIFY**	Fan **12XEF1** is	**OFF**
□	**VERIFY**	Fan **12XEF2** is	**OFF**
□	**VERIFY**	Vent **1AV1** is	**CLOSED**
□	**VERIFY**	Vent **11AV1** is	**CLOSED**
□	**VERIFY**	Vent **11AV2** is	**CLOSED**
□	**VERIFY**	Vent **11AV3** is	**CLOSED**
□	**VERIFY**	Vent **12AV1** is	**CLOSED**
□	**VERIFY**	Vent **12AV2** is	**CLOSED**
□	**VERIFY**	Vent **12AV3** is	**CLOSED**

□ **Check for Test Acceptance of Manual fan OFF controls in MCR**

1.20 Test of Emergency fan ON/OFF controls at 12GE1

PRESS **Emergency** fan **ON** button at gate **12GE1**

BEGIN **90-sec timer**

□	**VERIFY**	Fan **1EF1** is	**ON**
□	**VERIFY**	Fan **11EF2** is	**ON**
□	**VERIFY**	Fan **12EF1** is	**ON**
□	**VERIFY**	Fan **12XEF1** is	**ON**
□	**VERIFY**	Fan **12XEF2** is	**ON**
□	**VERIFY**	Vent **1AV1** is	**OPEN**
□	**VERIFY**	Vent **11AV1** is	**OPEN**
□	**VERIFY**	Vent **11AV2** is	**OPEN**
□	**VERIFY**	Vent **11AV3** is	**OPEN**
□	**VERIFY**	Vent **12AV1** is	**OPEN**
□	**VERIFY**	Vent **12AV2** is	**OPEN**
□	**VERIFY**	Vent **12AV3** is	**OPEN**

PRESS **Emergency** fan **OFF** button at gate **12GE1**
AFTER **90 secs** from **ON** command

□	**VERIFY**	Fan **1EF1** is	**OFF**
□	**VERIFY**	Fan **11EF2** is	**OFF**
□	**VERIFY**	Fan **12EF1** is	**OFF**
□	**VERIFY**	Fan **12XEF1** is	**OFF**
□	**VERIFY**	Fan **12XEF2** is	**OFF**
□	**VERIFY**	Vent **1AV1** is	**CLOSED**
□	**VERIFY**	Vent **11AV1** is	**CLOSED**
□	**VERIFY**	Vent **11AV2** is	**CLOSED**
□	**VERIFY**	Vent **11AV3** is	**CLOSED**
□	**VERIFY**	Vent **12AV1** is	**CLOSED**
□	**VERIFY**	Vent **12AV2** is	**CLOSED**
□	**VERIFY**	Vent **12AV3** is	**CLOSED**

□ **Check for Test Acceptance of Emergency fan OFF controls at gate 12GE1**

1.21 Test MCR reset of Emergency fan ON/OFF controls at 12GE1

	PRESS	**Emergency** fan **ON** button at gate **12GE1**	
	BEGIN	**90-sec timer**	
□	**VERIFY**	Fan **1EF1** is	**ON**
□	**VERIFY**	Fan **11EF2** is	**ON**
□	**VERIFY**	Fan **12EF1** is	**ON**
□	**VERIFY**	Fan **12XEF1** is	**ON**
□	**VERIFY**	Fan **12XEF2** is	**ON**
□	**VERIFY**	Vent **1AV1** is	**OPEN**
□	**VERIFY**	Vent **11AV1** is	**OPEN**
□	**VERIFY**	Vent **11AV2** is	**OPEN**
□	**VERIFY**	Vent **11AV3** is	**OPEN**
□	**VERIFY**	Vent **12AV1** is	**OPEN**
□	**VERIFY**	Vent **12AV2** is	**OPEN**
□	**VERIFY**	Vent **12AV3** is	**OPEN**
	PRESS	**Emergency** fan **OFF** button at **MCR**	
	AFTER	**90 secs** from **ON** command	
□	**VERIFY**	Fan **1EF1** is	**OFF**
□	**VERIFY**	Fan **11EF2** is	**OFF**
□	**VERIFY**	Fan **12EF1** is	**OFF**
□	**VERIFY**	Fan **12XEF1** is	**OFF**
□	**VERIFY**	Fan **12XEF2** is	**OFF**
□	**VERIFY**	Vent **1AV1** is	**CLOSED**
□	**VERIFY**	Vent **11AV1** is	**CLOSED**
□	**VERIFY**	Vent **11AV2** is	**CLOSED**
□	**VERIFY**	Vent **11AV3** is	**CLOSED**
□	**VERIFY**	Vent **12AV1** is	**CLOSED**
□	**VERIFY**	Vent **12AV2** is	**CLOSED**
□	**VERIFY**	Vent **12AV3** is	**CLOSED**

□ **Check for Test Acceptance of MCR reset of Emergency fan ON/OFF at gate 12GE1**

1.22 Test of ODH sensor 12XAS3 in 12XCB5 in service Building 1012A

	PLACE	**Peer 13** in **Mode 8**	
□	**VERIFY**	**Peer 13** is in **Restricted Access**	**MODE 8**
	FLOW	**Helium (or Nitrogen)** gas across **12XAS3**	
	RECORD	**Oxygen** trip level for **Div A**	**_____ %**
	RECORD	**Oxygen** trip level for **Div B**	**_____ %**
□	**VERIFY**	**MCR** sees **12XAS3 Div A**	**TRIPPED**
□	**VERIFY**	**MCR** sees **12XAS3 Div B**	**TRIPPED**
□	**VERIFY**	**Div A & B strobes** on **12XCB5** are	**FLASHING**
□	**VERIFY**	**Div A & B sonalerts** on **12XCB5** are	**SOUNDING**
□	**VERIFY**	Fan in **1012A** is	**ON**
□	**VERIFY**	Vent in **1012A** is	**OPEN**
	AFTER	**~ 30 secs**	
	TURN	Bypass Switch **to** Bypass	
□	**VERIFY**	**Strobes □, Sonalerts □** and **Fans** (after ~90secs) □	**STOP**
	TURN	Bypass Switch **from** Bypass	
□	**VERIFY**	**Strobes □, Sonalerts □** and **Fans** (after ~30secs) □	**CONTINUE**
	HALT	**Flow** of gas on **12XAS3**	
	WAIT	For **12XAS3** to clear (level ~ trip-level above)	
□	**VERIFY**	**Div A & B strobes** and **sonalerts** on **12XCB5** are	**OFF**
□	**VERIFY**	Fan in **1012A** is	**OFF**
□	**VERIFY**	Vent in **1012A** is	**CLOSED**
	RESET	**ODH** in **MCR**	
□	**VERIFY**	**MCR** sees **ODH** as	**RESET**

□ **Check for Test Acceptance of sensor 12XAS3 in 12XCB5 in service Building 1012A**

1.23 Summary of air flow at fan intakes and vents in sector 12

	RECORD	**Volume of air-flow** at the inlet of fan **11EF2**	**_____ LFM**
		Target flow value (± 10%)	***1592 LFM***
□	**VERIFY**	Air flow at tell-tale of vent **11AV1** is	**ADEQUATE**
□	**VERIFY**	Air flow at tell-tale of vent **11AV2** is	**ADEQUATE**
□	**VERIFY**	Air flow at tell-tale of vent **11AV3** is	**ADEQUATE**
	RECORD	**Volume of air-flow** at the inlet of fan **12XEF1**	**_____ LFM**
		Target flow value (± 10%)	***2078 LFM***
	RECORD	**Volume of air-flow** at the **upper** inlet of fan **12XEF2**	**_____ LFM**
		Target flow value (± 10%) is the sum of both ducts	***1592 LFM***
□	**VERIFY**	Air flow at tell-tale of vent **12AV1** is	**ADEQUATE**
□	**VERIFY**	Air flow at tell-tale of vent **12AV2** is	**ADEQUATE**
□	**VERIFY**	Air flow at tell-tale of vent **12AV3** is	**ADEQUATE**
	RECORD	**Volume of air-flow** at the inlet of fan **12EF1**	**_____ LFM**
		Target flow value (± 10%)	***2078 LFM***
	RECORD	**Volume of air-flow** at the inlet of fan **1EF1**	**_____ LFM**
		Target flow value (± 10%)	***1592 LFM***
□	**VERIFY**	Air flow at tell-tale of vent **1AV1** is	**ADEQUATE**

□ **Check for Acceptance of Summary of air-flow at fan intakes and vents in sector 12**

END OF TEST PROCEDURE

TTL: Sign for completion of initial testing: _____

Date: _____/____/_____

TTL: Sign for completion of final testing: _____

Date: _____/____/_____